



US010400445B2

(12) **United States Patent**
Battaglia

(10) **Patent No.:** **US 10,400,445 B2**
(45) **Date of Patent:** **Sep. 3, 2019**

(54) **MULLION SEAL**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **15/422,720**

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(22) Filed: **Feb. 2, 2017**

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(65) **Prior Publication Data**

US 2018/0216344 A1 Aug. 2, 2018

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(51) **Int. Cl.**
E04B 1/82 (2006.01)
E04B 2/96 (2006.01)
(Continued)

(57) **ABSTRACT**

(52) **U.S. Cl.**
CPC **E04B 1/8209** (2013.01); **E04B 1/62**
(2013.01); **E04B 1/84** (2013.01); **E04B 2/96**
(2013.01);
(Continued)

An acoustic seal for a sound flanking path between an an
interior architectural separation and a mullion. The seal may
be configured as an elongated rail having first and seal
surfaces with adhesive elements disposed on laterally offset
first and second adhesive-bearing portions thereof. When
installed, the elongated rail can maintain a non-deformed
state when opposing faces of the mullion and the architec-
tural separation are separated by a distance equal to the
elongated rail thickness. The elongated rail can assume a
deformed state when the opposing faces of the mullion and
the architectural separation are separated by a distance
greater than the elongated rail thickness. In the deformed
state, the longitudinal edges of the elongated rail become
offset from each other in a direction normal to first and
second seal surfaces. The elongated rail cross-section flexes
proximate to first and second flex locations that may option-
ally include stress relief features.

(58) **Field of Classification Search**
CPC E06B 1/62; E06B 2001/628; E06B 1/366;
E06B 2003/6244; E04B 1/84;
(Continued)

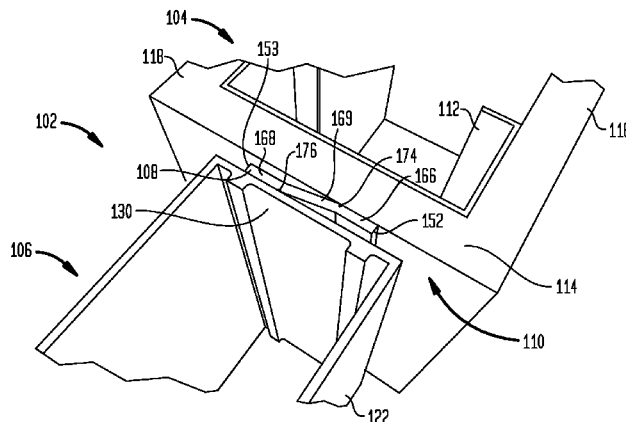
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21 Claims, 8 Drawing Sheets



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CPC **E04B 2/967** (2013.01); **F16J 15/02** 442/381
(2013.01); **E04B 2001/8254** (2013.01); **E04B**
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FIG. 1

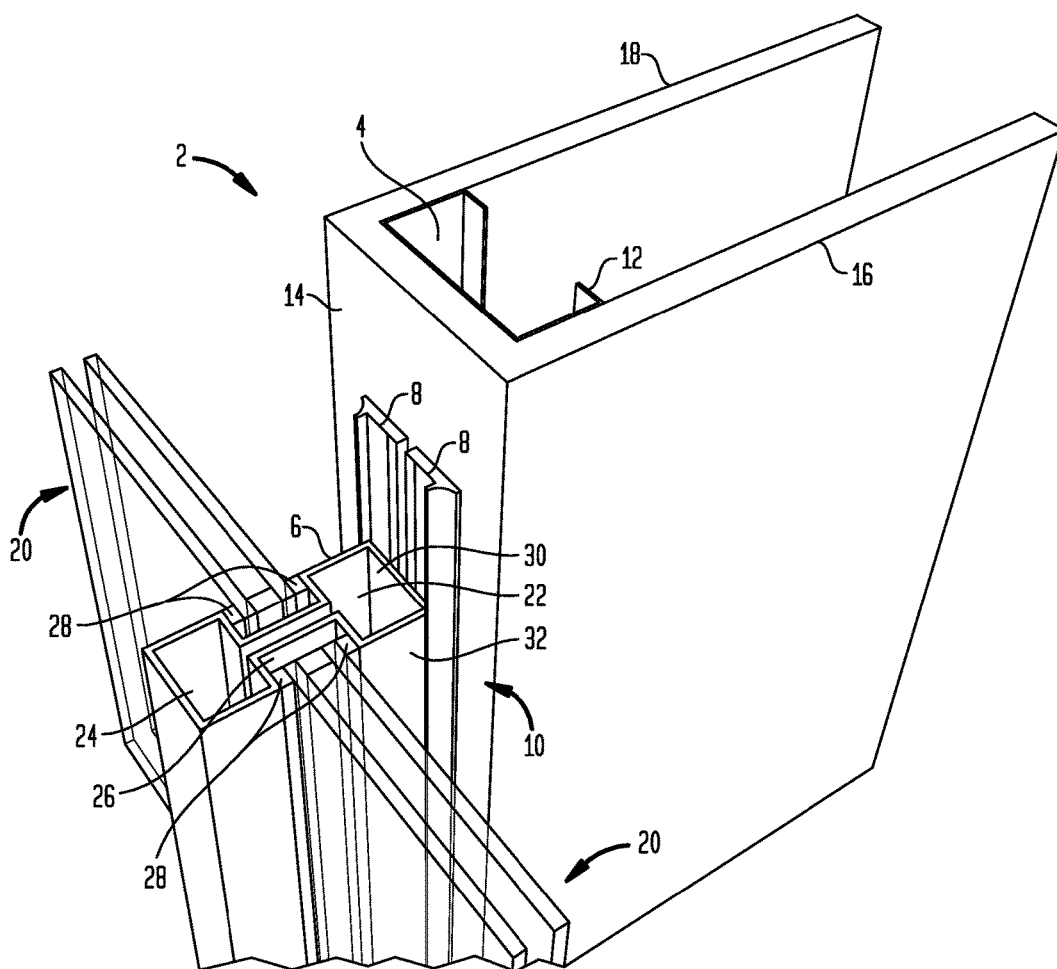


FIG. 2

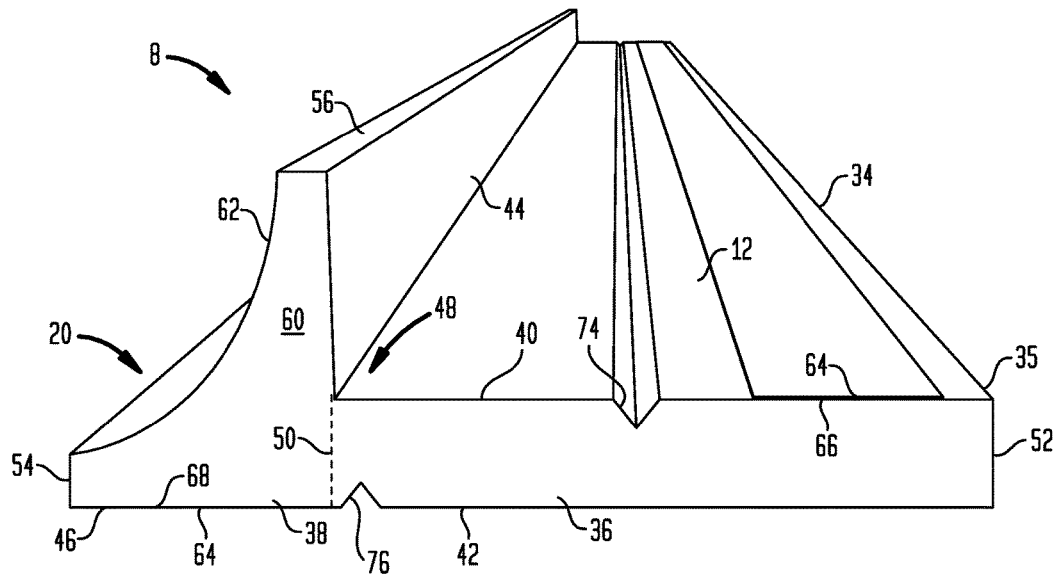


FIG. 3

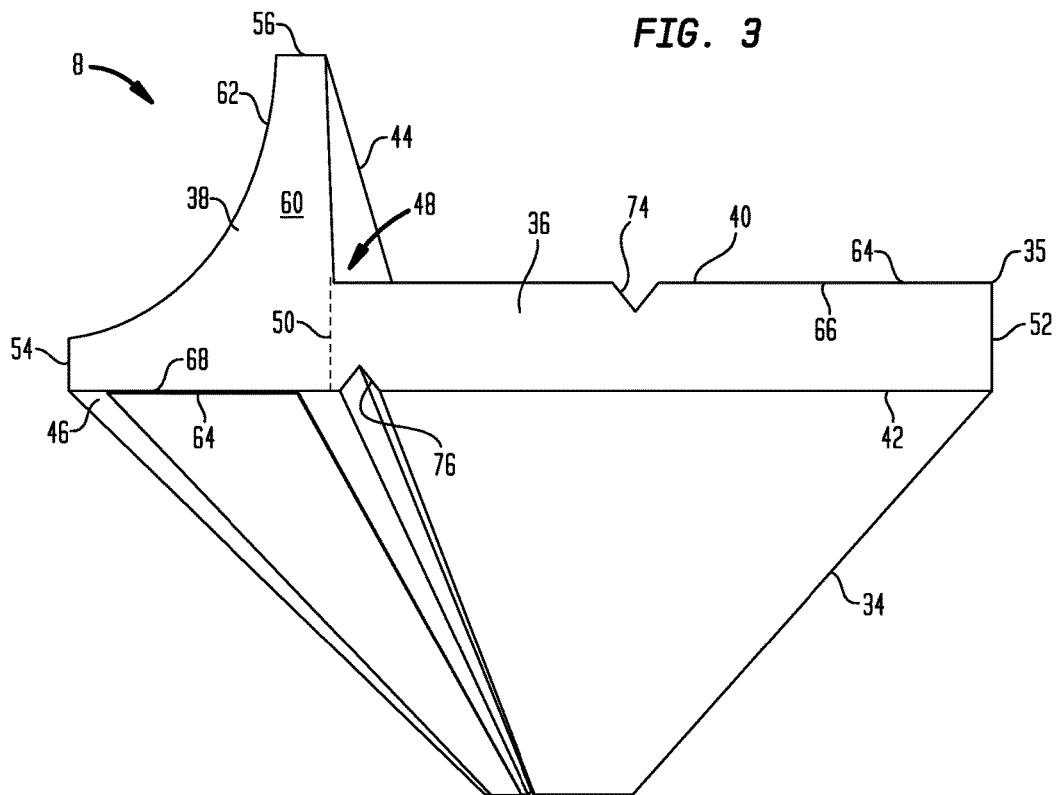


FIG. 4

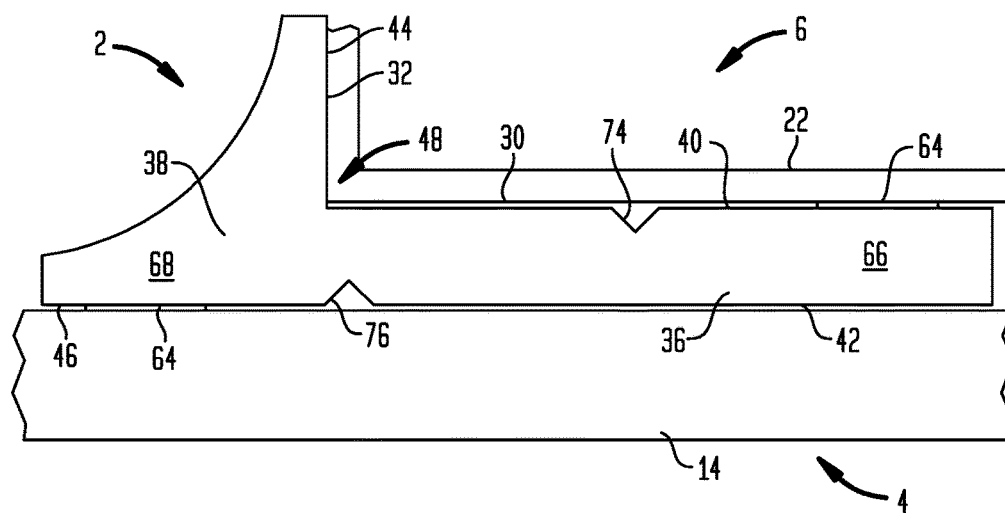


FIG. 5

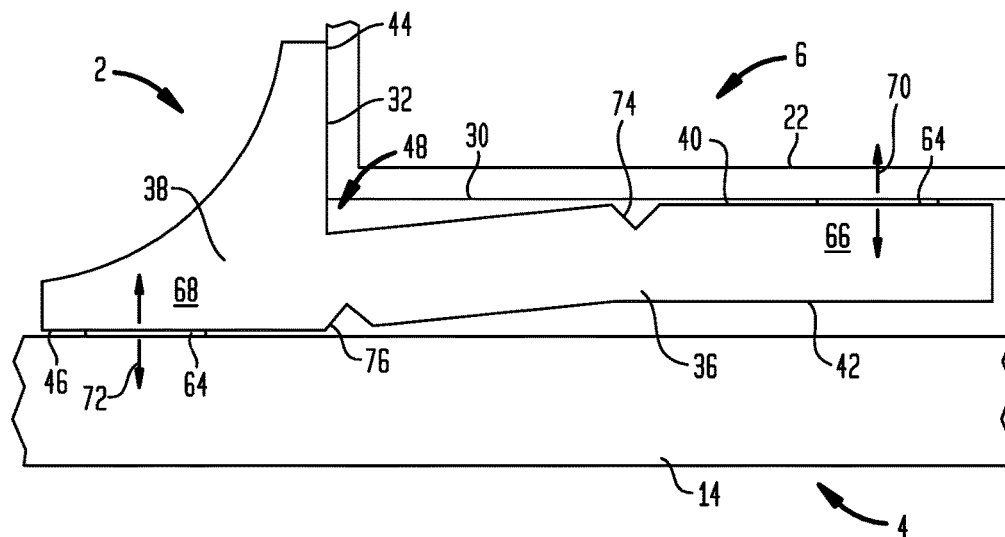


FIG. 6

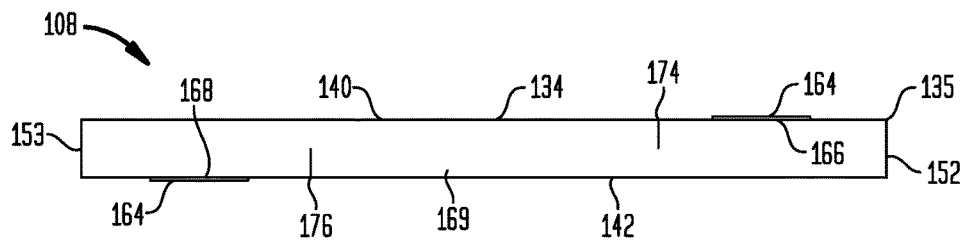


FIG. 7

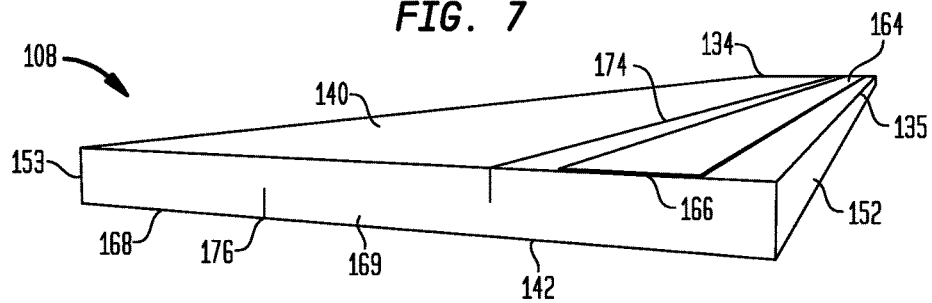


FIG. 8

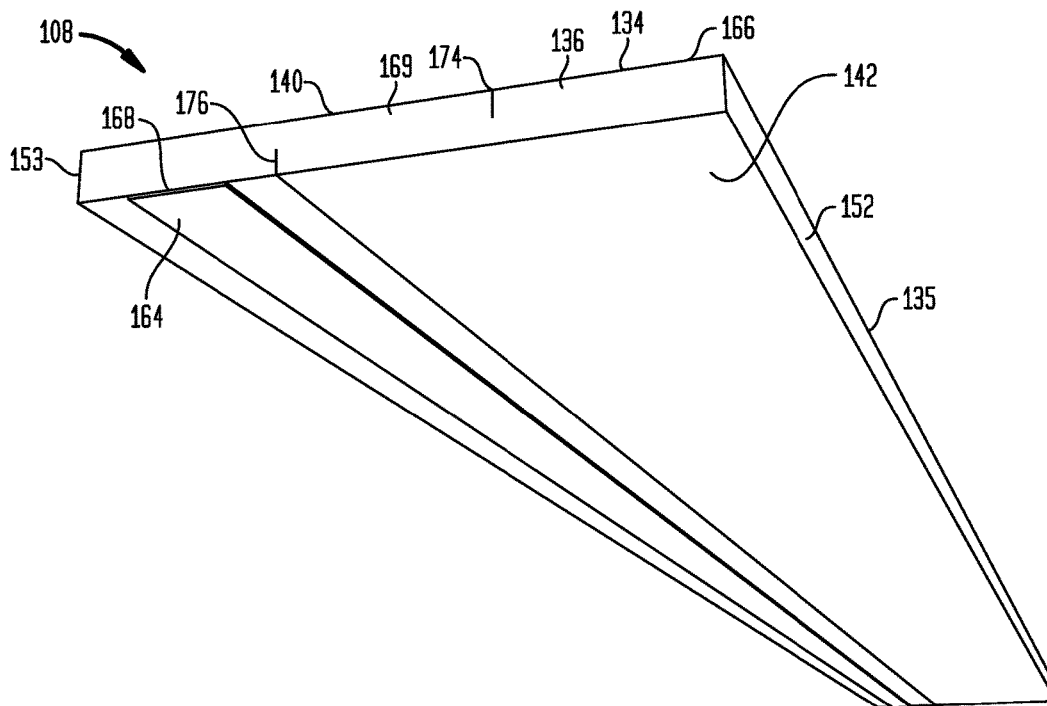


FIG. 9

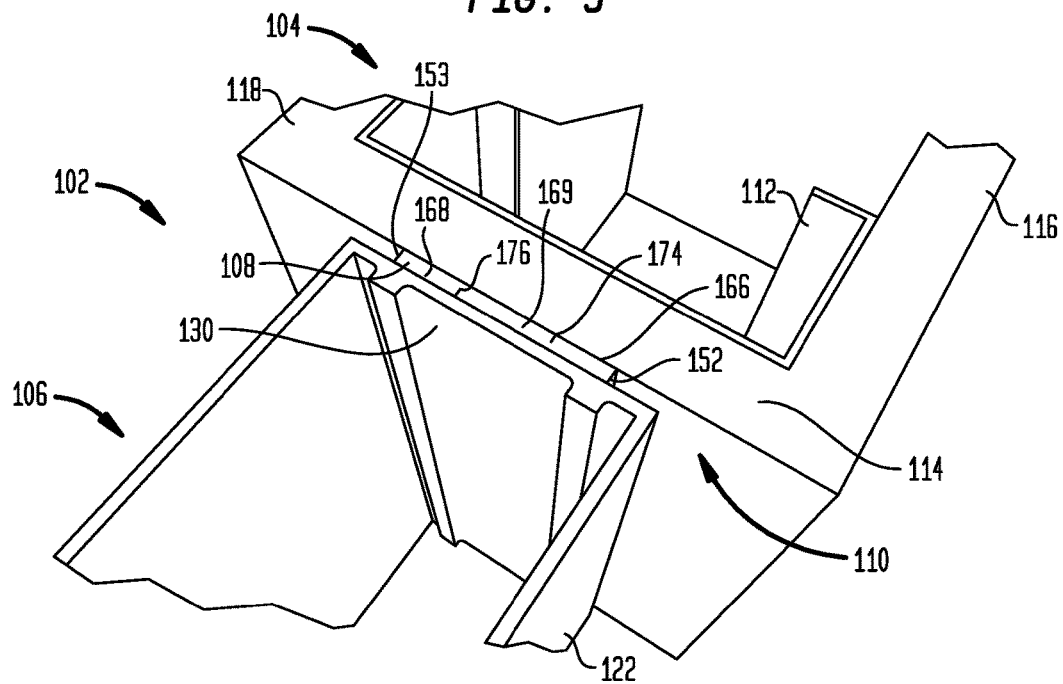


FIG. 10

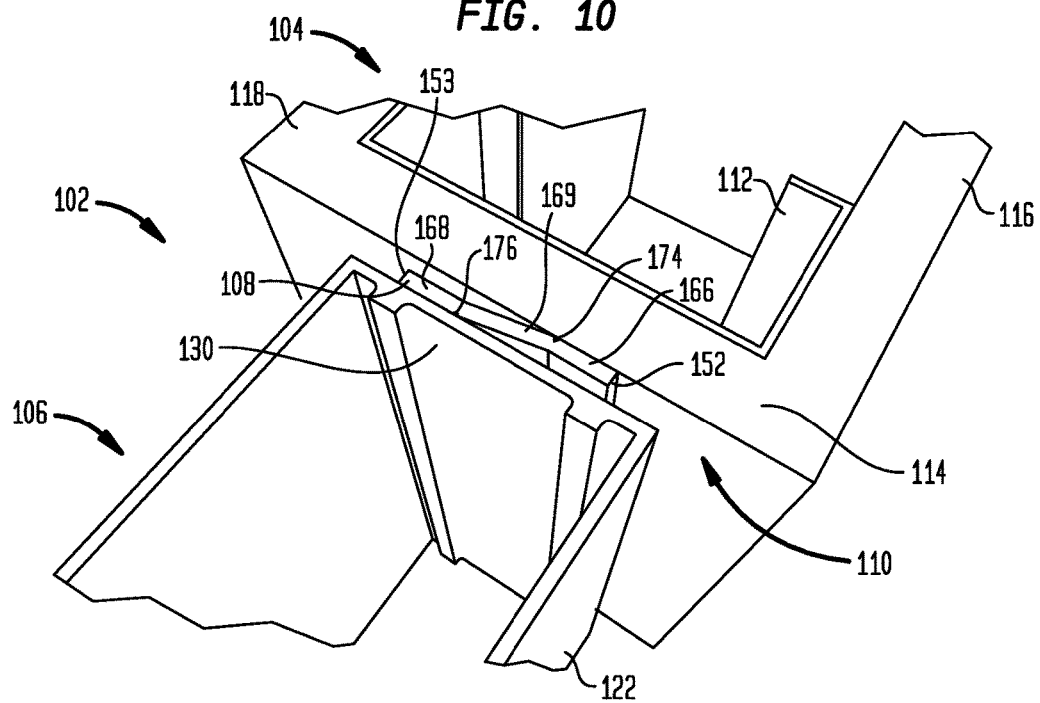


FIG. 11

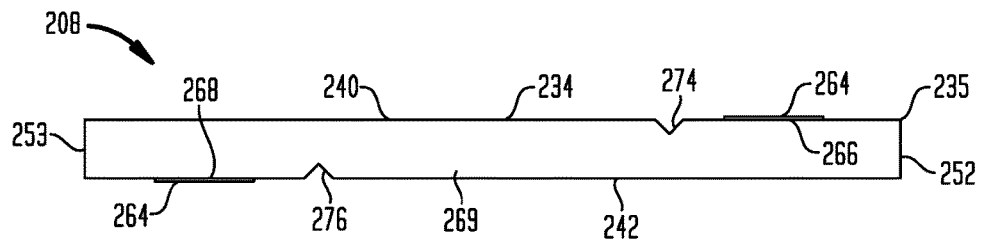


FIG. 12

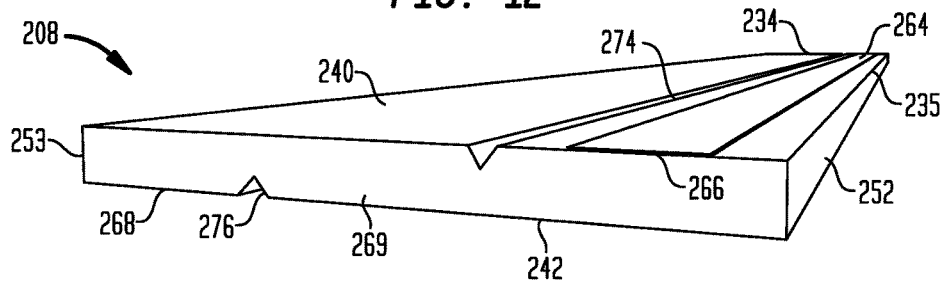


FIG. 13

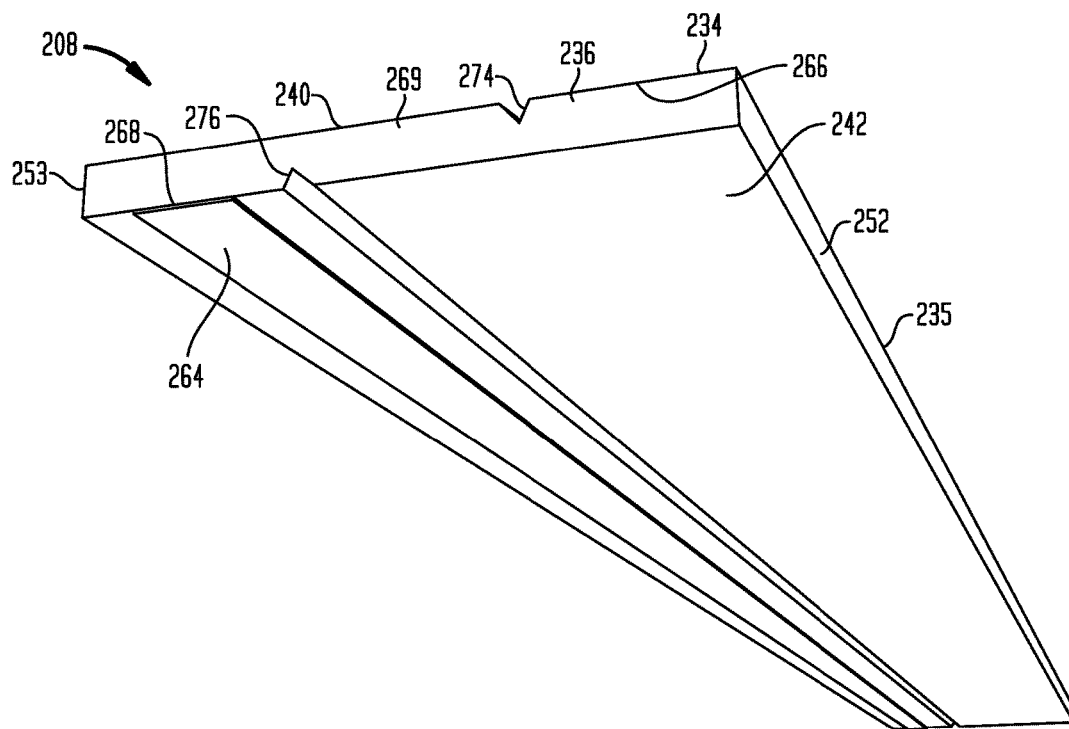


FIG. 14

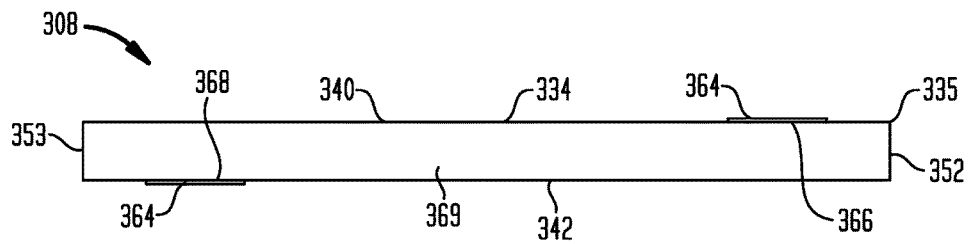


FIG. 15

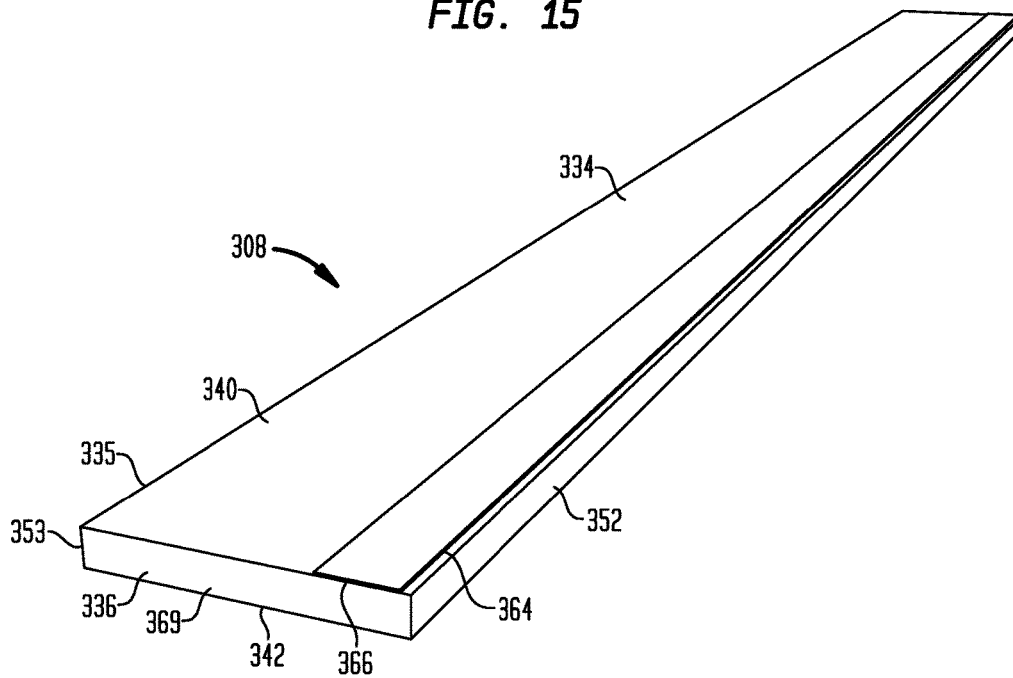
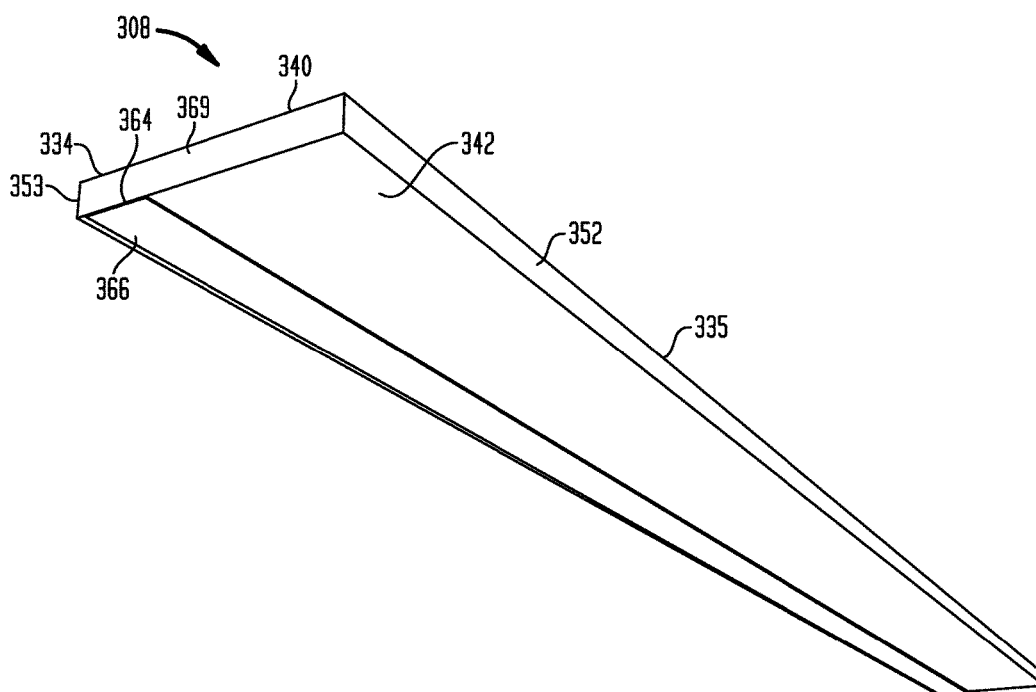


FIG. 16



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MULLION SEAL

BACKGROUND

1. Field

The present disclosure relates to sound suppression and acoustical privacy in architectural structures. More particularly, the disclosure is directed to noise attenuation in flanking paths between the ends of interior separations and mullions in curtain wall and storefront constructions.

2. Description of the Prior Art

By way of background, commercial building codes typically impose acoustic privacy restrictions that limit the amount of noise permitted to pass through interior separations. For example, section 1207.2 of the International Building Code (IBC) imposes the following requirement for air-borne sound:

“Walls, partitions and floor/ceiling assemblies separating dwelling units from each other or from public or service areas shall have a sound transmission class (STC) of not less than 50 (45 if field tested) for air-borne noise when tested in accordance with ASTM E 90.”

In curtain wall and storefront constructions, unsealed interfaces between the ends of interior separations and the exterior mullions produce “flanking paths” for air-borne sound that may severely compromise the transmission loss intended for the separation. The sound that invades through such flanking paths compromises the acoustic integrity of the separations irrespective of the acoustic attenuation qualities of the separation structures themselves. Applicant submits that this issue needs to be addressed if adequate levels of privacy and confidentiality are to be attained.

SUMMARY

In a first aspect, an acoustic seal is provided for sealing a sound flanking path between an interior architectural separation and a mullion. The acoustic seal may include a seal body that includes an elastomeric acoustic isolating material. The seal body may be configured as an elongated rail having a length and a cross-section defined by a width and a thickness of the elongated rail.

The elongated rail may have two substantially planar and mutually parallel sides spaced from each other by a distance that defines the elongated rail thickness. The elongated rail may have two longitudinal edges spaced from each other by a distance that defines the elongated rail width. A first one of the sides may define a first seal surface arranged to engage a first interior side of the mullion. A second one of the sides may define a second seal surface arranged to engage an end wall of the interior architectural separation.

A first adhesive element may be disposed on the first seal surface at a first adhesive-bearing portion of the elongated rail. A second adhesive element may be disposed on the second seal surface at a second adhesive-bearing portion of the elongated rail. The first and second seal body adhesive-bearing portions may be separated from each other by a mid-span region of the elongated rail cross-section. The first and second seal body adhesive-bearing portions may be laterally offset from each another, with the first seal body adhesive-bearing portion being proximate to a first one of the elongated rail longitudinal edges and the second seal body adhesive-bearing portion being proximate to a second one of the elongated rail longitudinal edges.

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The elongated rail may be attachable to opposing faces of the mullion and an end wall of the architectural separation by adhering the first adhesive element to a face of the mullion and by adhering the second adhesive element to a face of the architectural separation end wall. The elongated rail may maintain a non-deformed state when it is attached to the mullion and the architectural separation end wall with the opposing faces of the mullion and the architectural separation end wall being separated by a distance that equals the elongated rail thickness. The elongated rail may assume a deformed state when it is attached to the mullion and the architectural separation end wall with the opposing faces of the mullion and the architectural separation end wall being separated by a distance that is greater than the elongated rail thickness. The deformed state may include the first and second elongated rail longitudinal edges becoming offset from each other in a direction normal to the first and second seal surfaces, and the elongated rail cross-section becoming flexed proximate to first and second flex locations where the mid-span region of the elongated rail cross-section meets the first and second elongated rail adhesive-bearing portions.

In embodiment, the first and second adhesive elements may include first and second adhesive strips.

In an embodiment, each of the first and second adhesive strips may extend along the entire length of the elongated rail.

In an embodiment, the acoustic seal may further include first and second stress-relief features disposed at the first and second flex locations.

In an embodiment, the first and second stress-relief features may include slits extending partially through the elongated rail thickness.

In an embodiment, the slits extend through approximately half of the elongated rail thickness.

In an embodiment, the first and second stress-relief features may include notches extending partially through the elongated rail thickness.

In a second aspect of the disclosure, an architectural assembly may include an interior architectural separation, a mullion, and an acoustic seal as summarized above sealing a sound flanking path between an end wall of the interior architectural separation and the mullion.

In a third aspect of the disclosure, an architectural assembly construction method may include providing an acoustic seal as summarized above for sealing a sound flanking path between an interior architectural separation and a mullion. The acoustic seal may be attached to the mullion with the first adhesive element engaging an opposing face of the mullion. An end wall of an interior architectural separation may be attached to the acoustic seal with the second adhesive element engaging an opposing face of the end wall.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other features and advantages will be apparent from the following more particular description of example embodiments, as illustrated in the accompanying Drawings, in which:

FIG. 1 is a fragmentary perspective view showing an example architectural assembly having an interior architectural separation, a curtain wall or storefront mullion, and an acoustic seal arrangement sealing a sound flanking path between an end of the architectural separation and an interior face of the mullion;

FIG. 2 is a top perspective view of an acoustic seal that may be used in the architectural assembly of FIG. 1;

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FIG. 3 is a bottom perspective view of the acoustic seal of FIG. 2;

FIG. 4 is a fragmentary end view of the architectural assembly of FIG. 1;

FIG. 5 is a fragmentary end view according to FIG. 4, and showing flexing of the acoustic seal of the architectural assembly due to relative movement between the architectural separation and the mullion;

FIG. 6 is an end view of a first alternative acoustic seal that may be used in an architectural assembly to seal a sound flanking path between an the end of an interior architectural separation and an interior face of a curtain wall or storefront mullion;

FIG. 7 is a top perspective view of the first alternative acoustic seal of FIG. 6;

FIG. 8 is a bottom perspective view of the first alternative acoustic seal of FIG. 6;

FIG. 9 is a fragmentary perspective view showing an architectural assembly in which the first alternative acoustic seal of FIG. 6 is installed to seal a sound flanking path between the end of an interior architectural separation and an interior face of a curtain wall or storefront mullion;

FIG. 10 is a fragmentary view of the architectural assembly of FIG. 9 in which the interior face of the mullion has displaced away from the interior architectural separation, and with the first alternative acoustic seal flexing to accommodate the displacement;

FIG. 11 is an end view of a second alternative acoustic seal that may be used in an architectural assembly to seal a sound flanking path between an the end of an interior architectural separation and an interior face of a curtain wall or storefront mullion;

FIG. 12 is a top perspective view of the second alternative acoustic seal of FIG. 11;

FIG. 13 is a bottom perspective view of the second alternative acoustic seal of FIG. 11;

FIG. 14 is an end view of a third alternative acoustic seal that may be used in an architectural assembly to seal a sound flanking path between an the end of an interior architectural separation and an interior face of a curtain wall or storefront mullion;

FIG. 15 is a top perspective view of the third alternative acoustic seal of FIG. 14; and

FIG. 16 is a bottom perspective view of the third alternative acoustic seal of FIG. 14.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

Turning now to the drawing figures, which are not necessarily to scale, like reference numbers are used to indicate like structure in all of the several views. FIG. 1 illustrates an architectural assembly 2 constructed in accordance with an example embodiment of the present disclosure. In the illustrated embodiment, the assembly 2 includes an interior architectural separation 4, a curtain wall or storefront mullion 6, and a pair of acoustic seals 8 for sealing a sound flanking path 10 between the interior architectural separation and the mullion.

The architectural separation 4 may be of any suitable construction. In the illustrated embodiment, the architectural separation 4 is a metal frame vertical wall structure onto which sheets of drywall (a.k.a, gypsum board, wallboard, plasterboard) are mounted. In FIG. 1, only one end of the architectural separation 4 is shown, namely, the end that faces the mullion 6. At this end of the architectural separation 4, a vertical end stud 12 supports a narrow drywall sheet

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that defines an interior end wall 14 of the architectural separation. The end stud 12 additionally supports two dry-wall sheets that define respective first and second sidewalls 16 and 18 of the architectural separation. For ease of description, other structural elements that may be present in the architectural separation 4, such as additional wall studs, top and bottom plates, etc., are omitted from FIG. 1.

The mullion 6 may be of any suitable construction. In the illustrated embodiment, the mullion 6 is a frame structure, made from metal or other suitable material, that supports the opposing ends of a pair of glass sheet assemblies 20. The mullion 6 may include an interior member 22, an exterior member 24 and an intermediate member 26. Seal members 28 may be used to seal the ends of the glass sheet assemblies 20 to the mullion 6.

Of interest to the present discussion is the mullion's interior member 22, which may be of any suitable shape and construction. FIG. 1 illustrates one possible design in which the interior member 22 is of generally rectangular or similar shape, and may have either a tube-like (as shown) or solid construction. In the illustrated embodiment, the mullion interior member 22 defines a first interior side 30 of the mullion that opposes the end wall 14 of the architectural separation 4. The mullion interior member 22 also defines a pair of second interior sides 32 that extend from the edges of the first interior side 30, away from the end wall 14 of the architectural separation 4. The angles between the first interior side 30 and the second interior sides 32 are shown in FIG. 1 as being approximately 90 degrees (perpendicular). However, this is for purposes of illustration only, and it will be appreciated that other angles may be used.

With additional reference now to FIGS. 2 and 3, each acoustic seal 8 may include a seal body 34 that may be formed entirely from an elastomeric acoustic isolating material. Example materials include, but are not limited to, solid neoprene rubber having sufficient flexibility to allow the acoustic seal 8 to flex in the manner to be described below in connection with FIGS. 4 and 5. The acoustic seals 8 may be produced in a variety of colors, including but not limited to white, black, aluminum gray, etc.

The seal body 34 may be configured as an elongated rail 35 that may be extruded, molded or otherwise formed. The elongated length of the seal body 34 is a matter of design choice, but it may be advantageous to form the seal body into long lengths that can be wound into rolls and field-cut or trimmed to size at a construction job site to the actual lengths required. Alternatively, the seal body 34 could be produced in lengths that are compatible with a standard architectural floor-to-ceiling dimension, such as 8 ft., 10 ft., 12 ft., etc. For example, the seal body 34 could be any of the foregoing lengths, a multiple of such lengths, or a fraction of such lengths. It will be appreciated that if the seal body 34 is longer than the length needed for the architectural assembly 2, the seal body may be field-cut as needed. Similarly, if the seal body 34 is shorter than the length need for the architectural assembly 2, two or more acoustic seals 8 may be combined in a single run of such seals. However, care should be taken to avoid gaps between adjacent seals so as not to compromise acoustic isolation integrity.

The seal body 34 may include a base rail portion 36 and a side rail portion 38. The base rail portion 36 may have two substantially planar and mutually parallel base rail sides, one defining a first seal surface 40 arranged to engage the first interior side 30 of the mullion 6, the other defining a second seal surface 42 arranged to engage the end wall 14 of the architectural separation 4.

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The side rail portion **38** may have two substantially planar and mutually non-parallel side rail sides, one defining a third seal surface **44** that is substantially non-parallel (e.g., perpendicular) to the first seal surface **40** and arranged to engage one of the second interior sides **32** of the mullion **6**, the other defining a fourth seal surface **46** that is in substantially coplanar relationship with the second seal surface **42** and arranged to engage the end wall **10** of the architectural separation **4**.

The first seal surface **40** and the third seal surface **44** may form an inside corner **48** of the acoustic seal **8** that is arranged to envelop an outside corner of the mullion **6** defined by the first interior side **30** of the mullion and one of its second interior sides **32**. The angle of the inside corner **48** may be selected to correspond to the angle between the first and second interior sides **30** and **32** of the mullion **6**, thereby providing a tight fit with good acoustic isolation properties. In the illustrated embodiment, the inside corner **48** lies at the intersection of the first and third seal surfaces **40** and **44** at a laterally interior region **50** of the seal body **34**. The laterally interior region **50** may be thought of as the location at which the base rail portion **36** meets and merges with the side rail **38**, it being understood that both rail portions may be formed as part of a common integral structure. It will be appreciated that the configuration of the inside corner **48** may be square, filleted, (e.g., with a chamfer or radius) or otherwise defined to accommodate the outside corner profile of the mullion **6**.

The base rail portion **36** may have a base rail free edge **52** that defines a first longitudinal edge of the elongated rail **35**. The first and second seal surfaces **40** and **42** may extend from the laterally interior region **50** of the seal body **34** to the first base rail free edge **52**. The side rail portion **38** may have a first side rail free edge **54** that defines a second longitudinal edge of the elongated rail **35**. The fourth seal surface **46** may extend from the laterally interior region **50** of the seal body **34** to the first side rail free edge **54**. The third seal surface **44** may extend from the inside seal corner **48** to a second side rail free edge **56** that defines a longitudinal edge of a flange portion **60** of the elongated rail **35**.

If desired, the side rail portion **38** may be configured to have an angled surface **62** extending between the first and second side rail free edges **54** and **56**, such that the side rail portion functions as an architectural molding. In the illustrated embodiment, the angled surface **62** is curved, with the curvature being concave so as to provide a cove molding configuration. In other embodiments, the angled surface could be formed with a convex curvature so as to provide a round molding configuration. Other configurations could also be used.

As can be seen in FIGS. **2** and **3**, adhesive elements **64** may be disposed on respective first and second adhesive-bearing portions **66** and **68** of the first seal surface **40** and the fourth seal surface **46**. The adhesive elements **64** may be provided in the form of double-sided adhesive strips (e.g., with peel-off backing layers), or in any other suitable manner (including as quantities of liquid adhesive applied immediately prior to acoustic seal installation). As shown in FIGS. **2** and **3**, the adhesive elements **64** may extend continuously along the length of the elongated rail **35**. Alternatively, the adhesive elements **64** could be intermittent. The first and second adhesive-bearing portions **66** and **68** are laterally offset from each another. This provides an advantageous feature of the acoustic seal **8** that accommodates relative movement between the interior architectural separation **4** and the mullion **6** that produces changes in

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spacing between the end wall **14** of the interior architectural separation and the first interior side **30** of the mullion.

FIGS. **4** and **5** are illustrative. In FIG. **4**, the architectural assembly **2** is shown in a default state in which the end wall **14** of the architectural separation **4** and the first interior side **30** of the mullion **6** have a nominal spacing. This will likely be the spacing that exists when the acoustic seals **8** are initially installed in the architectural assembly **2**. In FIG. **5**, the architectural assembly **2** is shown in a deflected state following relative movement between the architectural separation **4** and the mullion **6** that increases the spacing between the end wall **14** of the architectural separation and the first interior side **30** of the mullion. This relative movement could be due to several factors, such as expansion, contraction, deflection or drift of the mullion **6**.

It will be seen in FIG. **5** that the acoustic seal **8** is capable of undergoing offset flexing that allows the base rail portion **36** to displace relative to the side rail section **38**. Due to the adhesive elements **64**, the first seal surface **40** remains attached to and travels with the first interior side **30** of the mullion **6**, and the fourth seal surface **46** remains attached to and travels with the end wall **14** of the architectural separation **4**. The arrows **70** and **72** illustrate the applied loads that develop on the acoustic seal **2** as the architectural separation **4** and the mullion **6** move away from each other. The relatively low elastic modulus of the acoustic seal material allows the acoustic seal **2** to undergo offset flexing without undue resistance.

To further facilitate offset flexing of the base rail portion **36** and the side rail portion **38**, a pair of first and second channels **74** and **76** serves as stress relief features that may be provided in the acoustic seal **8**. The first channel **74** may be formed in the first seal surface **40** between the first adhesive-bearing portion **66** and the interior corner **52**. The second channel **76** may be formed in the second seal surface **42** proximate to the laterally interior region **50** representing the area of intersection between the second seal surface and the fourth seal surface **46**. The first and second channels **74** and **76** may be configured in any suitable manner that facilitate the offset flexing. For example, in the illustrated embodiment, the first and second channels **70** and **72** are configured as V-shaped notches. Other channel configurations, such as slits, could also be used.

An advantage of constructing the acoustic seal **8** to undergo offset flexing is that the architectural separation **4** and the mullion **6** are allowed to move apart without the applied loads **70** and **72** on the adhesive **64** becoming excessive. Due to the elastic modulus of the acoustic seal material, the offset distance between the adhesive-bearing portions **66** and **68**, and the flexibility-enhancing properties of the channels **74** and **76**, the applied loads **70** and **72** remain relatively low. In contrast, if the adhesive-bearing portions **66** and **68** were not laterally offset, and instead were laterally aligned, any structural movement tending to increase the spacing between the architectural separation **4** and the mullion **6** would quickly produce large applied loads that would likely result in adhesive failure.

Returning now to FIG. **1**, the architectural assembly **2** may be constructed according an example method now to be described. According to this method, a pair of the acoustic seals **8** may be provided, such as by bringing or delivering the seals to the construction job site. If necessary, the acoustic seals **8** may be cut or trimmed to length and pre-fit on both interior corners of the mullion interior member **22**. The side rail portion **38** of the seal body **34** may be trimmed away (e.g., at the laterally intermediate region **50**) at the head, sill and intermediate horizontal mullions (if present) of

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the curtain or storefront wall, to provide a tight fit. The acoustic seals **8** may be mounted on the mullion **8** with the first sealing surface **40** of each seal facing the first interior side **30** of the mullion and the third sealing surface **44** facing one of the mullion's second interior sides **32**. The acoustic seals **8** may be secured to the mullion **6** using the adhesive element **64** located at the adhesive-bearing location **66**.

If the adhesive element **64** at the adhesive-bearing location **66** is in the form of an adhesive strip, one side may already be adhered to the acoustic seals **8**, and the seals may be attached to the mullion **6** by removing a peel-off backing (if present) from the other side of the adhesive strip prior to pressing the seals onto the mullion. Alternatively, if an adhesive strip is not already attached to the acoustic seals **8** at the adhesive-bearing location **66**, a pair of adhesive strips could first be applied to either the seals or the mullion **6**, and the seals could then be pressed onto the mullion. Once the acoustic seals **8** are in place, the end wall of the architectural separation **4** may be mounted to the seals, with the end wall **14** thereof facing the first and fourth sealing surfaces **40** and **46** of the seals.

One way to construct the architectural separation **4** is to form an assembly consisting of the drywall piece that forms the end wall **14** and the end stud **12**. Before attaching this assembly to the top and bottom plates of the architectural separation, the assembly may be mounted to the acoustic seals **8**, with the end wall **14** facing the second and fourth sealing surfaces **42** and **46**. The acoustic seals **8** may be secured to the end wall **14** using the adhesive element **64** located at the adhesive-bearing location **68**.

If the adhesive element **64** at the adhesive-bearing location **68** is in the form of an adhesive strip, one side may already be adhered to the acoustic seals **8**, and the seals may be attached to the end wall **14** by removing a peel-off backing (if present) from the other side of the adhesive strip prior to pressing the seals onto the end wall. Alternatively, if an adhesive strip is not already attached to the acoustic seals **8** at the adhesive-bearing location **68**, a pair of adhesive strips could first be applied to either the seals or the end wall **14**, and the end wall **14** could then be pressed onto the seals.

Once the end wall **14** is mounted to the acoustic seals **8**, the end stud **12** may be attached to the top and bottom plates of the architectural separation **4**. The drywall pieces that form the side walls **16** and **18** of the architectural separation **4** may then be installed onto the end stud **12** and the other framing elements (not shown) used to support the drywall.

Once the architectural assembly **2** is complete, the flanking path **10** will be acoustically blocked by the acoustic seals **8**, improving STC performance in comparison to an untreated joint. Cosmetically, the only visible component of the acoustic seals **8** will be the angled surface **62** that may be curved to appear as a molding.

Turning now to FIGS. 6-8, a first alternative acoustic seal **108** is shown that may be used to seal a sound flanking path between the end of an interior architectural separation and an interior face of a curtain wall or storefront mullion. The acoustic seal **108** has a number of similarities to the acoustic seal **8** described above, and these similarities are shown by the use of corresponding reference numbers incremented by 100. For example, the acoustic seal **108** may include a seal body **134** that may be formed entirely from the same elastomeric acoustic isolating material as the acoustic seal **8**. Such materials include, but are not limited to, solid neoprene rubber having sufficient flexibility to allow the acoustic seal **108** to flex in the manner described below in connection with FIGS. 9 and 10. Like the acoustic seal **8**, the acoustic seal

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108 may be produced in a variety of colors, including but not limited to white, black, aluminum gray, etc.

The seal body **134** may be configured as an elongated rail **135** that may be extruded, molded or otherwise formed. As in the case of the acoustic seal **8**, the length of the seal body **134** is a matter of design choice, but it may be advantageous to form the seal body into long lengths that can be wound into rolls and field-cut or trimmed to size at a construction job site to the actual lengths required. Alternatively, the seal body **134** could be produced in lengths that are compatible with standard architectural floor-to-ceiling dimensions, such as 8 ft., 10 ft., 12 ft., etc. For example, the seal body **134** could be any of the foregoing lengths, a multiple of such lengths, or a fraction of such lengths. It will be appreciated that if the seal body **134** is longer than the length needed for an architectural assembly, the seal body may be field-cut as needed. Similarly, if the seal body **134** is shorter than the length need for an architectural assembly, two or more acoustic seals **108** may be combined in a single run of such seals. However, care should be taken to avoid gaps between adjacent seals so as not to compromise acoustic isolation integrity.

Unlike the acoustic seal **108**, which has a base rail portion **36** and a side rail portion **38**, the acoustic seal **108** has no side rail. There is only a single base rail portion that represents the entirety of the elongated rail **135**. As shown in FIG. 6, the elongated rail **135** may have a generally rectangular cross-section defined by a width and a thickness of the elongated rail. The elongated rail **135** may have two substantially planar and mutually parallel sides, one defining a first seal surface **140** arranged to engage the interior side of the mullion, the other defining a second seal surface **142** arranged to engage the end wall of an architectural separation. The distance between the parallel sides that define the first and second seal surfaces **140** and **142** represents the thickness of the elongated rail cross-section. The elongated rail **135** may also have first and second longitudinal edges **152** and **153**. The distance between the longitudinal edges **152** and **153** represents the width of the elongated rail cross-section.

In example embodiments, the width dimension of the elongated rail **135** may be many times less than the length dimension, and the thickness dimension may be many times less than the width dimension. As noted above, the elongated rail **135** may have an elongated length dimension (shown in FIGS. 7 and 8) that may be on the order of many feet. By way of example only, and not by way of limitation, the elongated rail **135** may have a width dimension of between approximately 1-3.5 inches, with 1.75 inches being typical, and a thickness dimension of between approximately 0.0625-0.25 inches, with 0.125 inches being typical.

Adhesive elements **164** may be disposed on respective first and second adhesive-bearing portions **166** and **168** of the first and second seal surface **140** and **146**. Each adhesive element **164** may be provided in the form of double-sided adhesive strips (e.g., with peel-off backing layers), or in any other suitable manner (including as quantities of liquid adhesive applied immediately prior to acoustic seal installation). As shown in FIGS. 7 and 8, the adhesive elements **164** may extend continuously along the length of the elongated rail **135**. Alternatively, the adhesive elements **164** could be intermittent.

The first and second adhesive-bearing portions **166** and **168** are laterally offset from each other and proximate to respective ones of the longitudinal edges **152** and **153**. The adhesive-bearing portions **166** and **168** are separated by a mid-span region **169** of the elongated rail cross-section. This

provides an advantageous feature of the acoustic seal **108** that accommodates relative movement between an interior architectural separation and a mullion that produces changes in spacing between these two structures. To further facilitate such offset flexing, the acoustic seal **108** may be additionally formed with stress relief features, such as a pair of laterally offset first and second slits **174** and **176**. The first slit **174** may be formed in the first seal surface **140** at a flex location (see below) where the mid-span region **169** of the elongated rail cross-section meets the first adhesive-bearing portion **166**. The second slit **176** may be formed in the second seal surface **142** at a flex location (see below) where the mid-span region **169** of the elongated rail cross-section meets the second adhesive-bearing portion **168**. The slits **174** and **176** may be formed in any suitable manner, such as by cutting the longitudinal rail **135** after it is formed.

The first and second slits **174** and **176** may have a depth that is sufficient to facilitate the acoustic seal's offset flexing. For example, in the illustrated embodiment, the first and second slits **174** and **176** extend approximately halfway through the thickness of the seal body **134**. Each slit **174** and **176** may be spaced from the edge of the adjacent adhesive element **164** by the same distance that the other edge of the adhesive element is from the closest longitudinal edge **152** or **153**. In that way, each adhesive element **164** will be centered between a longitudinal slit and a longitudinal edge. For example, if the adhesive element **164** on the adhesive-bearing portion **166** is $\frac{1}{8}$ inches away from the longitudinal edge **152**, the slit **174** could be $\frac{1}{8}$ inches away from the adhesive. The other adhesive element **164** could be similarly centered between the slit **176** and the longitudinal edge **153**.

Turning now to FIGS. **9** and **10**, the ability of the acoustic seal **108** to flex following installation is illustrated. FIGS. **9** and **10** depict an architectural assembly **102** that is substantially similar the architectural assembly **2** of FIG. **1**, as shown by the use of corresponding reference numbers incremented by 100. The assembly **102** includes an interior architectural separation **104**, a curtain wall or storefront mullion **106**, and the acoustic seal **108** for sealing a sound flanking path **110** between the interior architectural separation and the mullion. It will be noted that only a single instance of the acoustic seal **108** blocks the sound flanking path **110** in the path traversal direction. By comparison, two acoustic seals **8** were used in the architectural assembly **2**, but this was due to the fact that the acoustic seals **8** also provided an architectural molding feature on each side of the mullion **6**. Because the acoustic seal **108** lacks a side rail molding, only one instance thereof is needed in the flanking path traversal direction. It will be appreciated that the acoustic seal **108** may be installed between the architectural separation **104** and the mullion **106** in essentially the same manner as previously described in connection with the acoustic seal **8**.

The architectural separation **104** may have the same construction as the architectural separation **4** of FIG. **1**. In the illustrated embodiment, the architectural separation **104** has a metal frame vertical wall structure onto which sheets of drywall (a.k.a., gypsum board, wallboard, plasterboard) are mounted. In FIGS. **9** and **10**, only one end of the architectural separation **104** is shown, namely, the end that faces the mullion **106**. At this end of the architectural separation **104**, a vertical end stud **112** supports a narrow drywall sheet that defines an interior end wall **114** of the architectural separation. The end stud **112** additionally supports two drywall sheets that define respective first and second sidewalls **116** and **118** of the architectural separation **104**. For ease of description, other structural elements that

may be present in the architectural separation **104**, such as additional wall studs, top and bottom plates, etc., are omitted from FIGS. **9** and **10**.

The mullion **106** may be of any suitable construction. In the illustrated embodiment, the mullion **106** is a frame structure, made from metal or other suitable material, that supports the opposing ends of a pair of glass sheet assemblies (not shown). Additional details of the mullion **106** correspond to the mullion **6** of FIG. **1**, and will not be repeated here.

Of interest to the present discussion is the mullion's interior member **122**, which may be of any suitable shape and construction. FIGS. **9** and **10** illustrates one possible design in which the interior member **122** is of generally rectangular or similar shape, and may have either a tube-like (as shown) or solid construction. In the illustrated embodiment, the mullion interior member **122** defines a first interior side **130** of the mullion that opposes the end wall **114** of the architectural separation **104**.

The sole difference between the architectural assembly **102** of FIGS. **9** and **10** and the architectural assembly **2** of FIG. **1** is that the latter relies on the substantially planar acoustic seal **108** for acoustic isolation along the sound flanking path **110** whereas the former relies on a pair of the substantially non-planar acoustic seals **8** to provide acoustic isolation. In FIG. **9**, the architectural assembly **102** is shown in a default state in which the end wall **114** of the architectural separation **104** and the first interior side **130** of a mullion **106** have a nominal spacing. This will likely be the spacing that exists when the acoustic seal **108** is initially installed in the architectural assembly **102**. In FIG. **10**, the architectural assembly **102** is shown in a deflected state following relative movement between the architectural separation **104** and the mullion **106** that increases the spacing between the end wall **114** of the architectural separation and the first interior side **130** of the mullion.

It will be seen in FIG. **10** that the acoustic seal **108** is capable of undergoing offset flexing that allows one edge **152** of the elongated rail **135** to displace relative to its other edge **153** so as to become offset a direction that is normal to the first and second sealing surfaces **140** and **142**. This results in the elongated rail cross-section becoming flexed proximate to first and second flex locations where the mid-span region **169** of elongated rail cross-section meets the first and second adhesive-bearing portions **166** and **168**. This is the location where the offset slits **174** and **176** are formed. Due to the adhesive **164**, the first seal surface **140** remains attached to and travels with the first interior side **130** of the mullion **106**, and the second seal surface **146** remains attached to and travels with the end wall **114** of the architectural separation **104**. The relatively low elastic modulus of the acoustic seal material allows the acoustic seal **108** to undergo offset flexing without undue resistance. The offset slits **174** and **176** further facilitate this offset flexing by virtue of being able to open.

Turning now to FIGS. **11-13**, a second alternative acoustic seal **208** is shown that may be used to seal a sound flanking path between an the end of an interior architectural separation and an interior face of a curtain wall or storefront mullion. The acoustic seal **208** is identical to the acoustic seal **108** of FIGS. **6-8**, except that the slits **174** and **176** have been replaced with channels shaped as v-shaped notches **274** and **276**, thus providing an alternative type of stress-relief feature. All other features of the acoustic seal **208**, as shown by the use of corresponding reference numbers incremented by 100.

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Like the slits 174 and 176 of the acoustic seal 108, the notches 274 and 276 of the acoustic seal 208 facilitate offset flexing to accommodate relative movement between an interior architectural separation and a mullion. The first notch 274 may be formed in the first seal surface 240 at a flex location where the mid-span region 169 of the elongated rail cross-section meets the first adhesive-bearing portion 266. The second notch 276 may be formed in the second seal surface 242 at a flex location where the mid-span region 169 of the elongated rail cross-section meets the second adhesive-bearing portion 268. The notches 274 and 276 may be formed in any suitable manner, such as during formation of the acoustic seal 108 (e.g., using an extrusion or molding process).

The first and second notches 274 and 276 may have a depth that is sufficient to facilitate the acoustic seal's offset flexing. For example, in the illustrated embodiment, the first and second notches 274 and 276 extend approximately halfway through the thickness of the seal body 134. Each notch 270 and 276 may be spaced from the edge of the adjacent adhesive element 264 by the same distance the other edge of the adhesive element is from the closest longitudinal edge 252 or 253. In that way, each adhesive element 264 will be centered between a longitudinal slit and a longitudinal edge. For example, if the adhesive element 264 on the adhesive-bearing portion 266 is $\frac{1}{8}$ inches away from the longitudinal edge 252, the notch 274 could be $\frac{1}{8}$ inches away from the adhesive. The other adhesive element 164 could be similarly centered between the notch 276 and the longitudinal edge 253.

Turning now to FIGS. 14-16, a second alternative acoustic seal 308 is shown that may be used to seal a sound flanking path between an end of an interior architectural separation and an interior face of a curtain wall or storefront mullion. The acoustic seal 308 is identical to the acoustic seal 108 of FIGS. 6-8 and the acoustic seal 208 of FIGS. 11-13, except that there are no slits or channels. All other features of the acoustic seal 308, as shown by the use of corresponding reference numbers incremented by 100. Although there are no slits or notches (or other stress-relief features), the flexibility of the acoustic material used in the construction of the acoustic seal 308 is such that the seal has the ability to undergo offset flexing in order to accommodate relative movement between an interior architectural separation and a mullion.

Accordingly, an acoustic seal has been disclosed for sealing a sound flanking path between an interior architectural separation and a mullion, together with an architectural assembly that incorporates the acoustic seal and an architectural assembly construction method. While various embodiments of the invention have been described, it should be apparent that many variations and alternative embodiments could be implemented in accordance with applicant's invention. It is understood, therefore, that the invention is not to be in any way limited except in accordance with the spirit of the appended claims and their equivalents.

What is claimed is:

1. An acoustic seal for sealing a sound flanking path between an interior architectural separation and a mullion, comprising:

a solid seal body formed entirely from an elastomeric acoustic isolating material;

said seal body being configured as an elongated rail having a length and a substantially rectangular cross-section defined by a substantially uniform width and a substantially uniform thickness of said elongated rail;

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said seal body having two substantially planar and mutually parallel sides extending the entire width of said cross-section, said sides being spaced from each other by a substantially uniform distance that defines said elongated rail thickness;

said seal body having two longitudinal edges spaced from each other by a substantially uniform distance that defines said elongated rail width;

a first one of said sides defining a first seal surface arranged to engage a first interior side of said mullion, and a second one of said sides defining a second seal surface arranged to engage an end wall of said interior architectural separation;

a discrete first adhesive element disposed on said first seal surface at a first adhesive-bearing portion of said elongated rail;

a discrete second adhesive element disposed on said second seal surface at a second adhesive-bearing portion of said elongated rail;

said first and second seal body adhesive-bearing portions being laterally offset and separated from each other by a mid-span region of said elongated rail cross-section that is free of adhesive on said first and second sides from said first adhesive element to said second adhesive element;

said first seal body adhesive-bearing portion being proximate to a first one of said elongated rail longitudinal edges and said second seal body adhesive-bearing portion being proximate to a second one of said elongated rail longitudinal edges;

said elongated rail being configured for attachment to opposing faces of said mullion and said end wall of said architectural separation by adhering said first adhesive element to a face of said first interior side of said mullion and by adhering said second adhesive element to a face of said architectural separation end wall;

said elongated rail being configured to maintain a non-deformed state when it is attached to said mullion and said architectural separation end wall with said opposing faces of said mullion and said architectural separation end wall being separated by a distance that equals said elongated rail thickness;

said elongated rail being configured to assume a deformed state when it is attached to said mullion and said architectural separation end wall with said opposing faces of said mullion and said architectural separation end wall being separated by a distance that is greater than said elongated rail thickness; and

said deformed state comprising said first and second elongated rail longitudinal edges becoming offset from each other in a direction normal to said first and second seal surfaces as a result of said first and second seal body adhesive-bearing portions being pulled in opposite directions due to said first adhesive element being adhered to said mullion, said second adhesive element being adhered to said architectural separation end wall, and said mid-span region of said elongated rail cross-section not being adhered to either said mullion or said architectural separation end wall, and said elongated rail cross-section becoming flexed proximate to first and second flex locations where said mid-span region of said elongated rail cross-section meets said first and second seal body adhesive-bearing portions.

2. The acoustic seal of claim 1, wherein said first and second adhesive elements comprise first and second adhesive strips.

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3. The acoustic seal of claim 2, wherein each of said first and second adhesive strips extend along the entire length of said elongated rail.

4. The acoustic seal of claim 1, further including first and second stress-relief features respectively disposed on said first and second seal surfaces at said first and second flex locations.

5. The acoustic seal of claim 4, wherein said first and second stress-relief features comprise slits extending respectively from said first and second seal surfaces partially through said elongated rail thickness.

6. The acoustic seal of claim 5, wherein said slits extend through approximately half of said elongated rail thickness.

7. The acoustic seal of claim 4, wherein said first and second stress-relief features comprise notches extending partially through said elongated rail thickness.

8. An architectural assembly, comprising:

an interior architectural separation;

a mullion;

an acoustic seal sealing a sound flanking path between said interior architectural separation and said mullion, said acoustic seal comprising:

a solid seal body formed entirely from an elastomeric acoustic isolating material;

said seal body being configured as an elongated rail having a length and a substantially rectangular cross-section defined by a substantially uniform width and a substantially uniform thickness of said elongated rail; said seal body having two substantially planar and mutually parallel sides extending the entire width of said cross-section, said sides being spaced from each other by a substantially uniform distance that defines said elongated rail thickness;

said seal body having two longitudinal edges spaced from each other by a substantially uniform distance that defines said elongated rail width;

a first one of said sides defining a first seal surface arranged to engage a first interior side of said mullion, and a second one of said sides defining a second seal surface arranged to engage an end wall of said interior architectural separation;

a discrete first adhesive element disposed on said first seal surface at a first adhesive-bearing portion of said elongated rail;

a discrete second adhesive element disposed on said second seal surface at a second adhesive-bearing portion of said elongated rail;

said first and second seal body adhesive-bearing portions being laterally offset and separated from each other by a mid-span region of said elongated rail cross-section that is free of adhesive on said first and second sides from said first adhesive element to said second adhesive element;

said first seal body adhesive-bearing portion being proximate to a first one of said elongated rail longitudinal edges and said second seal body adhesive-bearing portion being proximate to a second one of said elongated rail longitudinal edges;

said elongated rail being attached to opposing faces of said mullion and said end wall of said architectural separation by virtue of said first adhesive element being adhered to a face of said first interior side of said mullion and by said second adhesive element being adhered to a face of said architectural separation end wall;

said elongated rail maintaining a non-deformed state when said opposing faces of said mullion and said

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architectural separation end wall are separated by a distance that equals said elongated rail thickness;

said elongated rail assuming a deformed state when said opposing faces of said mullion and said architectural separation end wall are separated by a distance that is greater than said elongated rail thickness; and

said deformed state comprising said first and second elongated rail longitudinal edges becoming offset from each other in a direction normal to said first and second seal surfaces as a result of said first and second seal body adhesive-bearing portions being pulled in opposite directions due to said first adhesive element being adhered to said mullion, said second adhesive element being adhered to said architectural separation end wall, and said mid-span region of said elongated rail cross-section not being adhered to either said mullion or said architectural separation end wall, and said elongated rail cross-section becoming flexed proximate to first and second flex locations where said mid-span region of said elongated rail cross-section meets said first and second seal body adhesive-bearing portions.

9. The architectural assembly of claim 8, wherein said first and second adhesive elements comprise first and second adhesive strips.

10. The architectural assembly of claim 9, wherein each of said first and second adhesive strips extend along the entire length of said elongated rail.

11. The architectural assembly of claim 8, further including first and second stress-relief features respectively disposed on said first and second seal surfaces at said first and second flex locations.

12. The architectural assembly of claim 11, wherein said first and second stress-relief features comprise slits extending respectively from said first and second seal surfaces partially through said elongated rail thickness.

13. The architectural assembly of claim 12, wherein said slits extend through approximately half of said elongated rail thickness.

14. The architectural assembly of claim 11, wherein said first and second stress-relief features comprise notches extending partially through said elongated rail thickness.

15. An architectural assembly construction method, comprising:

providing an acoustic seal for sealing a sound flanking path between an interior architectural separation and a mullion, said acoustic seal comprising:

a solid seal body formed entirely from an elastomeric acoustic isolating material;

said seal body being configured as an elongated rail having a length and a substantially rectangular cross-section defined by a substantially uniform width and a substantially uniform thickness of said elongated rail; said seal body having two substantially planar and mutually parallel sides extending the entire width of said cross-section, said sides being spaced from each other by a substantially uniform distance that defines said elongated rail thickness;

said seal body having two longitudinal edges spaced from each other by a substantially uniform distance that defines said elongated rail width;

a first one of said sides defining a first seal surface arranged to engage a first interior side of said mullion, and a second one of said sides defining a second seal surface arranged to engage an end wall of said interior architectural separation;

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a discrete first adhesive element disposed on said first seal surface at a first adhesive-bearing portion of said elongated rail;

a discrete second adhesive element disposed on said second seal surface at a second adhesive-bearing portion of said elongated rail;

said first and second seal body adhesive-bearing portions being laterally offset and separated from each other by a mid-span region of said elongated rail cross-section that is free of adhesive on said first and second sides from said first adhesive element to said second adhesive element;

said first seal body adhesive-bearing portion being proximate to a first one of said elongated rail longitudinal edges and said second seal body adhesive-bearing portion being proximate to a second one of said elongated rail longitudinal edges;

said elongated rail being configured for attachment to opposing faces of said mullion and said end wall of said architectural separation by adhering said first adhesive element to a face of said first interior side of said mullion and by adhering said second adhesive element to a face of said architectural separation end wall;

said elongated rail being configured to maintain a non-deformed state when it is attached to said mullion and said architectural separation end wall with said opposing faces of said mullion and said architectural separation end wall being separated by a distance that equals said elongated rail thickness;

said elongated rail being configured to assume a deformed state when it is attached to said mullion and said architectural separation end wall with said opposing faces of said mullion and said architectural separation end wall being separated by a distance that is greater than said elongated rail thickness; and

said deformed state comprising said first and second elongated rail longitudinal edges becoming offset from each other in a direction normal to said first and second seal surfaces as a result of said first and second seal body adhesive-bearing portions being pulled in oppo-

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site directions due to said first adhesive element being adhered to said mullion, said second adhesive element being adhered to said architectural separation end wall, and said mid-span region of said elongated rail cross-section not being adhered to either said mullion or said architectural separation end wall, and said elongated rail cross-section becoming flexed proximate to first and second flex locations where said mid-span region of said elongated rail cross-section meets said first and second seal body adhesive-bearing portions;

attaching said acoustic seal to said mullion with said first adhesive element engaging an opposing face of said mullion; and

attaching said interior architectural separation end wall to said acoustic seal with said second adhesive element engaging an opposing face of said end wall.

16. The architectural assembly construction method of claim **15**, wherein said first and second adhesive elements comprise first and second adhesive strips.

17. The architectural assembly construction method of claim **16**, wherein each of said first and second adhesive strips extend along the entire length of said elongated rail.

18. The architectural assembly construction method of claim **15**, further including first and second stress-relief features respectively disposed on said first and second seal surfaces at said first and second flex locations.

19. The architectural assembly construction method of claim **18**, wherein said first and second stress-relief features comprise slits extending respectively from said first and second seal surfaces partially through said elongated rail thickness.

20. The architectural assembly construction method of claim **19**, wherein said slits extend through approximately half of said elongated rail thickness.

21. The architectural assembly construction method of claim **18**, wherein said first and second stress-relief features comprise notches extending partially through said elongated rail thickness.

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